LONDON.—At King's College, Prof. W. Grylls Adams, F.R.S., will continue the course of lectures on Light, and the Scientific Principles involved in Electric Lighting, during the remainder of the session. A course of practical work in Electrical Testing and Measurement with especial reference to Electrical Engineering will also be carried on under his direction in the Wheatstone Laboratory. The lectures will be given once a week—on Mondays, at 2 p.m.—and the Laboratory will be open on Wednesday and Friday from 1 to 4.

SCIENTIFIC SERIALS

THE monthly parts of the *Journal of Botany* for 1883 contain many useful and interesting papers. Among the more important must be regarded Mr. J. G. Baker's synopsis of the genus *Selaginella*. This is not yet completed, but already extends to nearly 100 species, many of them now described for the first time. This is understood to be an instalment of a complete monograph by Mr. Baker of the Vascular Cryptogams, excluding ferns, a work eagerly demanded by botanists.—The additions to the phanerogamic flora of Great Britain are not yet completed; and the palm of recent discoveries must be awarded to Mr. Arthur Bennett. In this year's record he describes and figures two, one of them, *Potamogeton Griffithii*, new to science, from a lake in Carnarvonshire. The other, *Naias marina*, is a native of the "Broads" of Norfolk. This is rendered more interesting by the discovery, by other botanists, of another species of *Naias*, *N. alagnensis*, also during the present year, in Lancashire. It is not many years since the genus was first found in Britain; and the only species hitherto known, *N. flexilis*, has been gathered only in Scotland and Ireland.—The structure and distribution of the Characeæ are still engaging attention from Messrs. H. and J. Groves and others; and of this cryptogamic order, another species, *Chara Braunii*, has also been added to the flora of Great Britain.—Mr. H. Boswell also describes two new British mosses, *Bryum gemmiparum*, from Breconshire, and *Sphagnum torreyanum*, from Shropshire.—Messrs. R. M. Christy and H. Corder contribute an interesting paper on the cross-fertilisation of *Arum maculatum*.—Numerous other articles and short notices of more local and special interest fill up the number.

THE second part of vol. xiv. of *Pringsheim's Jahrbücher für wissenschaftliche Botanik* contains two important articles on cryptogamic botany:—Dr. A. Fischer, on the occurrence of crystals of gypsum in the Desmidieæ shows that they are of very wide distribution in the family, as well as in other freshwater algæ such as *Spirogyra*, though by no means universally present. He believes it to be simply a product of excretion in the process of metastasis, whether present in the form of crystals or dissolved in the cell-sap. Dr. O. Müller, on the law of cell division in *Melosira arenaria*, offers an important contribution to the life-history of the diatoms. By a most careful series of observations he establishes the law that "the larger daughter-cell of the *n*th generation divides in the following or $(n + 1)$st generation, while the smaller daughter-cell always divides only in the $(n + 2)$nd generation," by an argument which is too long to go into here. He deduces from this law the reason of the comparatively rare occurrence of the auxospores, by which the original size of the species is restored after the continued degradation which it necessarily undergoes in the process of division.—B. Fritsch contributes also a paper on coloured granular constituents of the cell-contents.

THE second part of vol. iv. of *Engler's Botanische Jahrbücher* for 1883 contains a continuation of its very valuable review of the more important works on systematic and geographical botany which appeared in 1882.—The other papers are:—By T. Wenzig, on the genus *Fraxinus*.—By F. Moewes, on hybrids of *Mentha arvensis* and *M. aquatica*.—By E. Warming, on the order Podostemaceæ.

Archives of the Physical and Natural Sciences, Geneva, December 15, 1883.—Meteorological *résumé* of the year 1882 for Geneva and the Great Saint-Bernard, by M. A. Kammermann, Assistant-Astronomer.—On the ancient lake of the Soleure district (coloured map), by M. Alph. Favre. The existence of this lacustrine basin confirms the conclusion arrived at by other geological studies, that during the early post-Glacial epoch a far greater portion of Switzerland was under water than at present.—Descriptive notice of the meteorological observatory installed on September 1, 1882, at Sentlis, canton of Appenzell, 2467 metres above sea-level.—On the periodical oscillations of the ground, determined by the spirit-level (fifth year, 1882-83), by M. P. L. Plantamour.—On the theory of dynamo-electric machines, by M. R. Clausius. These machines having in their practical development outstripped the theory of their construction, an attempt is made in this elaborate paper to expound a theory more in harmony with the results already obtained than are any of the mathematical formulas hitherto employed to represent them.

Rendiconto of the Sessions of the Accademia delle Scienze di Bologna for the year 1882-83. Nov. 19, 1882.—Memoir on the "null envelopes" of the second class in a given system of points affected by given coefficients, showing how, from the general formula, others may be deduced, rendering more evident the property of the envelopes, and solving some questions connected with the momenta of the second order of said system, by Prof. Ferdinando P. Ruffiani.—On three sicephalous monsters, and more particularly on the seven-month Janus recently born in Bologna, by Prof. Luigi Calori.—Note on the extremities of the motor nerve fibres in the striated muscles of the torpedo (*Torpedo marmorata*) treated with bichloride of gold and cadmium, by Prof. G. V. Ciaccio.—Microscopic researches on the traces of electric sparks incised on glass, by Prof. Elmilio Villari.—On the electric figures of condensers, by the same author.

November 26.—A systematic classification of the genus Puccinia, by Prof. Cocconi and Dr. F. Morini.—On a case of hypertrophic hepatitis, by Prof. C. Taruffi.—Symptomatic and anthropometric studies on the cretinism prevalent in the Valle d'Aosta, Piedmont, by the same author.—Some new researches on the artificial reproduction of the spleen, by Prof. Guido Tizzoni.—On the results of the measures hitherto adopted to improve the soil and climate of malarious districts in Italy, by Dr. Paolo Predieri.—A new contribution to the study of Addison's disease, by Prof. Ferdinando Verardini.

January 14, 1883.—On a fossil cetacean (*Orca cetoniensis*) recently discovered at Cetona in Tuscany, by Prof. G. Capellini.—A study of some reactions of phosphuretted hydrogen gas, by Dr. Alfredo Cavazzi.

January 28.—On a rapid method for determining the lunar motions, by Prof. A. Saporetti.—New researches on the anatomy and pathology of the placenta in mammals, by Prof. G. Escolani.

February 11.—Notes on the history of geodesy in Italy from the earliest times down to the second half of the present century, by Prof. P. Riccardi.—Experimental researches on the hypertrophy and partial regeneration of the liver, by Dr. V. Colucci.—On the relative length of the neck in both sexes, and on the best method of making these anthropometric measurements, by Dr. G. Peli.—On the preventive inoculation of contagious pleuro-pneumonia for cattle by means of intravenous injection of the virus, by Prof. A. Gotti.—Anatomical researches on five bovine monstrosities, by Prof. G. P. Piana.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, January 10.—"Experimental Researches on the Electric Discharge with the Chloride of Silver Battery." By Warren De La Rue, M.A., D.C.L., Ph.D., F.R.S., and Hugo Müller, Ph.D., F.R.S.

Plasticity and Viscosity of Strata.—During our experiments we have often been struck by the evident plasticity of strata whose form at times becomes modified when they meet with an obstacle or are influenced by other causes, as, for example, the crossing of other strata produced by a separate discharge.

One of our tubes, No. 9, with a residual hydrogen vacuum, has a diaphragm in the centre ¼ of an inch, 0·63 cm., thick, through the centre of which there is a hole ¼ of an inch, 0·63 cm., in diameter. To the end of the tube is attached a potash absorption chamber, the heating and cooling of which causes a change in the number of strata; when the number of strata increases they approach closer and closer to the diaphragm, and occasionally one threads itself through it, as if squeezed through, and its form is gradually changed thereby.

A tube, No. 368, Fig. 1, with a hydrogen residue gives evidence of the viscosity of a stratum.

At right angles is a tube of smaller diameter; in this tube is a stopper having a loop underneath from which is suspended by two silk fibres, *s*, a piece of decarbonised iron, *n n'*. The stopper when greased turns quite smoothly, and by rotating it the needle can be easily placed in any direction with regard to the tube.

In the first place the tube was placed in the magnetic meridian, and the needle of iron wire, *n n'*, in the same direction; tested by means of a very small magnet, both ends were equally attracted and not repelled, showing that the needle had been thoroughly decarbonised; this was done by heating it to redness for many hours in peroxide of iron, prepared by burning its oxalate.

The discharge was in the first instance passed from the ring to the point, so that the needle was in the dark space; no magnetism

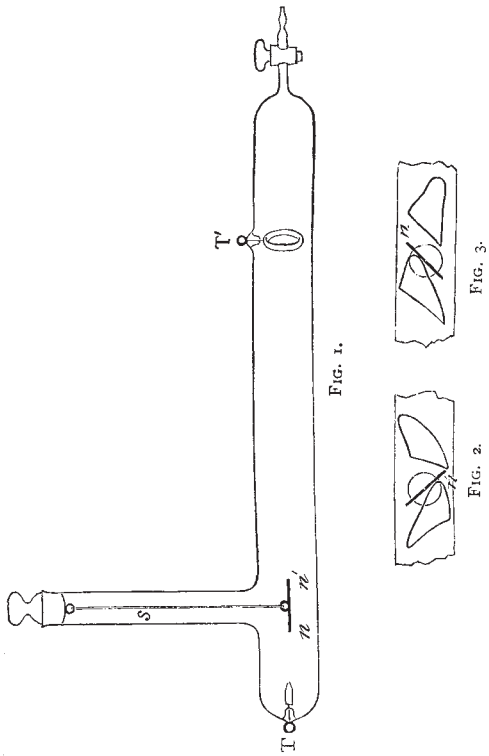

FIG. 1.

FIG. 3.

FIG. 2.

was developed in the needle, which would have been the case if the discharge had had a spiral motion as we have often observed and described to be sometimes the case. It was indeed with the object of ascertaining this fact that the apparatus had been made.

The needle was now placed at right angles to the tube, and the point made positive; after a few trials at different exhausts a beautiful tongue-shaped stratification was obtained, and it was then possible by altering the amount of the current to make the apex of a stratum impinge on one or the other end of the needle, Figs. 2 and 3; on whichever end the stratum touched, that end was pushed away by it, showing clearly that the balance of forces which hold together the molecules composing a stratum are sufficient to render it viscous, and unyielding to a small resistance.

Geological Society, January 23.—R. Etheridge, F.R.S., vice-president, in the chair.—George Henry Nelson and John Philip Spencer were elected Fellows of the Society.—The following communications were read:—On the Serpentine and associated rocks of Porthalla Cove, by J. H. Collins, F.G.S.—Outline of the geology of Arabia, by C. M. Doughty. Communicated by Prof. T. G. Bonney, F.R.S. The author described the general outline of the geology of a considerable district of the western part of Arabia, over which he had travelled. It was not in his power to enter into details, especially as regarded the sedimentary rocks, because the circumstances under which his journey was undertaken made it impossible to bring back specimens. There was, however, considerable simplicity in the geological structure of the country. The igneous rocks consisted of granites and basalts, the latter breaking through the former. The sedimentary rocks, which are newer than the granites and, in fact, rest upon them, consist of—(*a*) A yellowish sandstone, with stains of a reddish or greenish colour and veins of ironstone. In this, for example, the rock-tombs, &c., of Petra have been excavated. These substances, in the author's opinion, may be traced as far as Medina, and occur all about Kasîm. They often weather in a singular way; pebbles are scarce in them; fossils he had not seen. (*b*) The limestone contains bands of flint, and appears to be identical with that which occurs in Palestine, and is, he thinks, probably of Cretaceous age. (*c*) Of much later date is a coarse flat gravel which overspreads a considerable tract of country, as, for example, at Mount Seir in Edom, altogether about 250 square miles. The flints are doubtless derived from the limestone, and are often polished by drifting sand. It occurs on plateaux at very considerable elevations above the sea, sometimes forming the highest ground in the neighbourhood; and sections had shown this gravel to be more than 20 feet deep. In it the author had discovered two or three flint weapons of palæolithic type, rude, but very like those of Hoxne or St. Acheul. The granite by its aspect and mode of occurrence recalls that of Sinai. It is cut by dykes of basalt; and now and then the author had observed other intrusive igneous rocks, which he must be content to classify as traps. The dykes of basalt, however, were not the only modes of occurrence of this rock; there were considerable flows of basaltic lavas and occasional small craters. These volcanic districts bear the name of Harra; the principal are the Aneyrid, the Khaybar, and the Kesshub. The last lies between Nejd Arabia and the Mecca country. These masses of lava, &c., are comparatively modern; eruption, indeed, has in one or two localities occurred in historic times, and steam has been seen to issue from certain craters.

Physical Society, January 26.—Prof. Clifton in the chair.—New member, Yung Free, Secretary of the Chinese Legation.—Prof. Clifton announced that Lady Siemens had presented a portion of the late Sir William Siemens's library to the Society.—The meeting, which was at first a special meeting to consider the resolution that it is expedient for the past presidents of the Society to be permanent vice-presidents, having agreed to this resolution, was constituted an ordinary meeting, and Professors Ayrton and Perry described and exhibited their new ammeters and voltmeters, also a non-sparking key. The well-known ammeters and voltmeters of the authors used for electric light work are now constructed so as to dispense with a constant, and give the readings in amperes and volts without calculation. This is effected by constructing the instruments so that there is a falling off in the controlling magnetic field, and a considerable increase in the deflecting magnetic field. The deflections are thus made proportional to the current or E.M.F. measured. The ingenious device of a core or soft iron pole piece adjustable between the poles of the horseshoe magnet is used for this purpose. By means of an ammeter and voltmeter used conjointly, the resistance of part of a circuit, say a lamp or heated wire, can be got by Ohm's law. Professors Ayrton and Perry's non-sparking key is designed to prevent sparking with large currents. It acts by introducing a series of resistance-coils determined experimentally one after the other in circuit, thereby cutting off the spark.—Dr. C. R. Alder Wright, F.R.S., read a paper on the electromotive force set up during interdiffusion, being the result of experiments made by himself and Mr. C. Thompson to determine the effect of varying densities of solutions used in voltaic cells on their E.M.F.'s. The observations were made by constructing the cells of pure materials and opposing them so that the differential E.M.F.'s could be measured by galvanometer or quadrant electrometer, when solutions of different densities were employed. The following general conclusions were reached: (1) In any two fluid cells containing solutions of two metallic salts and plates of the respective metals contained therein, an increase of strength in the solution surrounding the plate acquiring the higher potential in virtue of the normal action of the cell causes an increment in the potential difference between the two plates; and the opposite effect is produced by an increment in the strength of the solution surrounding the other plate. (2) A law of summation holds, expressible thus: the effect of the sum of a series of changes in the strengths of the solutions in a two-fluid cell is equal to the algebraic sum of the effects of each change severally. The author considered this law very fully; and pointed out that "diffusion cells" act at least partly after the fashion of thermo-couples transforming into electric energy a certain amount of sensible heat.

Anthropological Institute, January 22.—Anniversary meeting.—Prof. Flower, F.R.S., president, in the chair.—The following gentlemen were elected officers and Council for the year 1884:—President: Prof. W. H. Flower, F.R.S.; vice-presidents: Hyde Clarke, John Evans, F.R.S., Francis Galton, F.R.S., Lieut.-Col. H. H. Godwin-Austen, F.R.S., Major-General Pitt-Rivers, F.R.S., E. B. Tylor, F.R.S.; director: F. W. Rudler, F.G.S.; treasurer: F. G. H. Price, F.S.A.; Council: J. Beddoe, F.R.S., S E. B. Bouverie-Pusey, E. W. Brabrook, F.S.A., C. H. E. Carmichael, M.A., W. L. Distant, C. I. Elton, B.A., A. W. Franks, F.R.S., J. G. Garson, M.D., Prof. Huxley, F.R.S., Prof. A. H. Keane, B.A., A. L. Lewis, Sir J. Lubbock, Bart., M.P., R. Biddulph Martin, M.P., Henry Muirhead, M.D., J. E. Price, F.S.A., Lord Arthur Russell, M.P., Prof. G. D. Thane, A. Thomson, F.R.S., Alfred Tylor, F.G.S., M. J. Walhouse, F.R.A.S.—The President delivered an address on the aims and prospects of the study of anthropology, which we gave last week.

EDINBURGH

Royal Society, January 21.—Robert Grey, vice-president, in the chair.—Prof. Crum Brown communicated a paper on distant vision, by Dr. Maddox. Dr. Maddox finds that accommodation for a distant object in the case of most persons is naturally connected with a slight convergence of the optic axes, so that the intersection of the optic axes is nearer than the object looked at. At a certain distance, different in different persons, and probably varying in the same person from time to time, the optic axes naturally converge at the distance focused for. When a nearer object is looked at, the point of intersection of the optic axes is beyond the object. In ordinary vision these differences between the distance of convergence and of accommodation are not observed, because the effort for single vision easily overcomes them, and forces the optic axes into the portion corresponding to the accommodation.—Mr. John Aitken read a paper on the dark plane in dusty air, a full report of which was given in our last issue.—Mr. Aitken also read a note on the recent sunsets.

CAMBRIDGE

Philosophical Society, January 28.—On the microscopic structure of a boulder from the Cambridge Greensand found near Ashwell, Herts, by Prof. Bonney.—On critical or apparently neutral equilibrium, a note on Mr. Greenhill's paper, *Camb. Phil. Proc.*, 1883, by Mr. J. Larmor.—On the normal vibrations of a thin isotropic shell, bounded by confocal spheroids, by Mr. W. J. Ibbetson.—On the isochromatic curves of polarised light seen in a uniaxial crystal cut at right angles to the optic surface, by Mr. C. Spurge.—Tables of the number of numbers less than n and prime to it, and of the sum of the divisors of n, and the corresponding inverse tables up to $n = 3000$, by Mr. J. W. L. Glaisher.

PARIS

Academy of Sciences, January 21.—M. Rolland in the chair.—Reflections on M. P. Bert's last communication regarding his new method of anæsthesis in surgical operations, by M. Gosselin. Although somewhat inconvenient in practice, the author still considers that the innovation presents certain advantages, while supplying a fresh argument to those who recommend moderate and progressive inhalation, rather than a large dose administered all at once. In his reply M. Bert submits that the objections raised to his method on the ground of the cumbrous nature of the apparatus are greatly exaggerated in the case of public hospitals. He further urges that it appears to be the only process in which surgeons are relieved of all personal responsibility in administering anæsthetics.—On the preparation in large quantities of artificial virus (bacilli of splenetic blood) attenuated by rapid heating (continued), by M. A. Chauveau. Here the author explains the conditions essential to the successful performance of this important and difficult operation. The subject is treated at length under the following heads:—(1) on the degree of heat required for the complete attenuation of the artificial virus; (2) on the heating process; (3) on the practical value of this system of prophylactic inoculation.—Extract from a letter by Baron Nordenskjöld on the remarkable optical effects observed during the last two months at sunset and sunrise in Sweden, presented by M. Daubrée. The author suggests that the phenomenon cannot be attributed exclusively to the dust discharged during the recent eruptions in Sunda Strait. Small particles of dust contained in the snow which fell near Stockholm at the end of last December were found on analysis to contain a considerable quantity of carboniferous matter, which burnt in the dry state with a flame, and left a reddish residuum containing oxidised iron, silica, phosphorus, and as much as 0·5 per cent. of cobalt and nickel.—Observations of the Pons-Brooks comet made at the Brunner 6-inch equatorial (0·160m.), Observatory of Lyons (continued, by M. F. Gonnessiat.—On the multipliers of linear differential equations, by M. Halphen.—On the approximate values assumed by an integral polynome when the variable quantity varies within definite limits, by M. Laguerre.—Note on the shading of a sphere, by M. J. Cotillon. The author here attempts a reproduction of the shaded sphere traditionally said to have been constructed at the École Polytechnique on the theoretical indications supplied by Monge.—On the electric conductibility of greatly diluted saline solutions, by M. E. Bouty. M. Berthelot, who insists on the importance of the results obtained by M. Bouty, points out that, according to the new law established by his numerous experiments, the electric resistance of greatly diluted solutions is determined, not by the atomic weight, but by the chemical equivalent of the bodies.—On the repulsion of two consecutive portions of the same electric current, by M. Izarn.—On the development of the nacreous crystals of sulphur, by M. D. Gernez.—Determination of the equivalent of chromium by means of the sesquioxide of its sulphate, by M. H. Baubigny.—Telegraphic despatch regarding the liquefaction of hydrogen addressed to M. Debray by M. Wroblewski. On this communication, which was worded: "Hydrogen cooled by boiling oxygen has been liquefied by expansion," M. Debray offers some remarks, and shows how it entirely confirms the remarkable observations made by M. Cailletet on the expansion of hydrogen.—On the products of reduction of erythrite by formic acid, by M. A. Henninger.—On an aromatic diacetone, by M. E. Louise.—Quantitative analysis of the moisture of amylaceous substances (starch, fecula, &c.), by M. L. Bondonneau.—On the classification of the plumicole Sarcoptidæ (sub-family of the Analgesinæ), by MM. E. L. Trouessart and P. Mégnin.—On the Cipolino marble of Paclais, Loire-Inférieure, by M. Stan. Meunier. From a careful study of this remarkable calcareous formation the author considers that even more than the blue marble of Antrim it may be regarded as a type of metamorphic rock by contact.—On the nature of the deposits observed in the water of contaminated wells, by M. E. Gautrelet. To the organisms examined under the microscope the author gives the name of *Stercogona tetrastoma*, and for several reasons concludes that they are the true typhic microbe.—On the remarkable atmospheric disturbances produced by the Krakatoa eruption, by M. E. Renou.—On the twilight effects observed on December 27 on the summit of the Puy de Dôme, by M. Alluard.—The recent remarkable sunsets and sunrises compared with those observed in various parts of Europe during the summer of 1831, by M. A. Angot.

January 28.—M. Rolland in the chair.—Spectral study of the group of telluric bands in the brightest regions of the solar spectrum, which were discovered by Brewster and collectively called α by Angström, one illustration, by M. A. Cornu. A protracted study of the bandlets of lines in this mysterious α band has suggested a practical method for distinguishing by simple inspection the lines of telluric from those of solar origin. It has also enabled the author to establish the intimate relation between this group and the A and B Fraunhofer bands, while the origin of the group itself must be referred to absorption by the oxygen of the air.—Remarks on Faraday's electrochemical law in connection with the law discovered by M. Bouty regarding the conductibility of greatly diluted saline solutions, by M. Wurtz.—On the atmospheric disturbances attributed to the Krakatoa eruption, and on the storm of January 26, by M. C. Wolf. The storm was announced the day before by great oscillations of the magnetic curves, especially those of the declinometer. The most remarkable feature attending it was its sudden cessation about one o'clock a.m. when the velocity of the gale fell at once from 38m. to 12m. per second.—On the physical disturbances that have taken place during the last few months, by M. Faye.—On the period of most frequent occurrence of solar spots in recent times, according to the data supplied by M. R. Wolf of Zurich, by M. Faye. The maximum (424) seems to have been reached during the first six months of 1882.—Remarks on the official topographic chart of Algeria, scale 1 : 50,000, the first twelve sheets of which have been presented to the Academy, by M. F. Perrier.—On the employment of titrate mixtures of anæsthetic vapours and air in the

administration of chloroform, by M. Richet.—Note on the dissemination, assimilation, and determination of phosphoric acid in arable lands, by M. P. de Gasparin.—On the mean movement of the first satellite of Saturn (Mimas), based on ninety-one observations made at Toulouse since October 24, 1876, by M. B. Baillaud.—Observation of the Pons-Brooks comet made at the Observatory of Meudon (one illustration), by M. E. L. Trouvelot.—On the reduction of a continuous fraction of a fraction satisfying a linear equation of the first order with rational coefficients, by M. Laguerre.—Further reduction of the limits furnished by Descarte's rule of signs, by M. D. André.—On the distribution of the potential in liquid masses limited by two parallel planes, by M. Appell.—Relation between the power and resistance applied to the two points of attachment in a continuous spring break, regard being had to the elasticity of the spring, by M. H. Léauté.—On the reciprocal action of two electrified spheres, by M. Mascart.—On the Skrivanow electric pile (pocket model), by M. D. Monnier.—On the variations of electromotor force in accumulators, by M. E. Reynier.—On a method of determining the longitude of a place, the latitude and astronomic time being known, by the observation of the true altitude of the moon at a given moment beforehand, by M. Ch. Rouget.—Report on the fresh experiments made with the marine gyroscope on board the ironclad *Le Turenne* in the harbour of Brest on November 11 and 16, 1883, by M. Edm. Dubois.—On a new method of preparing the permanganate of barytum, by MM. G. Rousseau and B. Bruneau.—On a nitrous colloid derived from amidobenzoic acid, by M. E. Grimaux.—On some remarkable properties of the lutidine derived from coal tar, by M. Oechsner de Coninck.—On the operculum of the gasteropods, by M. Houssay.—On the proportion of incompletely oxidised phosphorus contained in the urine, especially under certain nervous conditions, by MM. R. Lépine, Eymonnet, and Aubert.—Researches on the intensity of the chemical phenomena of respiration in superoxygenised atmospheres, by M. L. de Saint Martin.—Researches on abnormal menstrual discharges, by M. J. Rouvier.—On the barometric disturbances produced by the Krakatoa eruption (second note), by M. E. Renou.—On the barometric disturbances observed on August 27, 1883, at Montsouris, by M. Marié-Davy.—On the causes (1) of the production of atmospheric electricity in general; (2) of electricity in thunderstorms; (3) of electricity of sheet-lightning, by M. G. le Goarant de Tromelin.—On an auroral and crepuscular display of light observed at the island of Réunion, in the Indian Ocean, on September 8, 1883, by M. Pélagaud.

BERLIN

Physiological Society, January 11.—Prof. Kossel discussed the methods which had hitherto been adopted in order to become acquainted with the transformations of nitrogenous substances in the animal body in the course of their passage from the well-known starting point, the albumen, to the likewise well-known final products, urea, uric acid, and creatine. The way which, in the opinion of the speaker, was most likely to lead to good results was to seek in the tissues the chemical combinations which, in accordance with their composition, stood midway between the albumen and its final products. In relation to this point, the analyses of nitrogenous substances occurring in the animal body had already yielded some definite data to work on. The proportion of carbon to nitrogen (C : N) had, namely, been found to be, in the albumen, 100 : 30; in urea, 100 : 233; in creatine, 100 : 66; in hypoxanthine and xanthine, 100 : 93; and in guanine, 100 : 116. It appeared evident, therefore, that the substances creatine, hypoxanthine, xanthine, and guanine were mediate products in the process of the transmutation of the albumen, with the discovery of which in the tissues Prof. Kossel had been busied. The bases hypoxanthine, xanthine, and guanine were not found in an isolated state in the tissues, but compounded with albumen and phosphoric acid into the complicate molecule, nuclein, a subject to which the speaker had devoted searching inquiry. There were different forms of nuclein which varied probably according to the share the bases had in their composition. All of them, however, agreed in having common reactions. Nuclein had already, by its discoverer, been brought into close relationship with the cell-nucleus, and it would be of great consequence if it could be conclusively proved that the cell-nucleus consisted exclusively of nuclein, as in that case the changes of the cell-nucleus occurring under different physiological conditions would be accompanied by chemically demonstrable quantitative changes in this nuclein substance. The quantitative analysis of the nuclein could, namely, be worked out by determining the xanthine or guanine bases. In this case, however, it was necessary to ascertain beforehand that the tissue examined contained no free xanthine or guanine besides the nuclein. A second method for determining the quantitative nuclein was through determining the amount of phosphoric acid in the composition. Phosphoric acid occurred in the body in three different combinations, namely, as inorganic phosphoric salt, in lecithin, and in nuclein. Inorganic phosphoric acid was to be extracted by diluted acids, lecithinic phosphoric acid by hot alcohol. The phosphoric acid then remaining would belong to the nuclein, and could serve for its quantitative determination. Prof. Kossel had now ascertained that the blood of mammalia contained no nuclein, while on the other hand the blood of birds did. The muscles contained little nuclein, the brain somewhat more; still more was found in the liver, and most of all in the spleen. In all these successive cases the nuclein substance kept about equal pace with the presence of cell-nucleus. Nuclein was also, however, to be met with in substances which contained no cell-nucleus; in the yolk, for example, and in the milk. Possibly in this case there might be chemical proof of granules without their having come morphologically to view. In pathological processes, by which cell-nucleus becomes excessively developed in tissues which otherwise contained no cell-nucleus, as was the case in leucæmia or sarcomatous tumours in the muscles, Prof. Kossel had invariably found an increase of nuclein in corresponding quantities.—Dr. W. Wolff explained some microscopical preparations which he had set up in the demonstrating hall. In one of these preparations was seen a stage in the development of the nerves in the tail of the larva of a frog. These nerves consisted of primitive fibres ramifying as far as the finest fibrelets. At a farther stage cells were seen attaching themselves to these at the thicker parts. Next appeared the nerve-sheath, and finally the marrow. Other preparations demonstrated the growth of the bones of frogs which took place only at the periosteum and at the ends of the diaphyses. By treatment with chromic acid and with two different aniline colours, Dr. Wolff had stained the cartilages a beautiful blue, and the osseous tissue red, and was therefore able readily to follow the development of the latter.

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